

Practice Case #4 – The Price is Right

Difficulty: Moderate

Pharma Co. is a large US pharmaceutical corporation. They research, develop, and manufacture drugs across a variety of therapeutic areas. They have recently finished developing a drug to treat arthritis.

Arthritis is a degenerative joint disease that affects the joints and surrounding tissues. Common symptoms of this disease include joint pain and stiffness, swelling, and decreased range of motion of affected joints.

The company expects that the drug will get FDA approval soon, and be ready for launch into the market. However, they are not sure what price to set for the drug. The CFO has hired you to help with this. What should the price of this new drug be?

(Sample framework is on the following page)

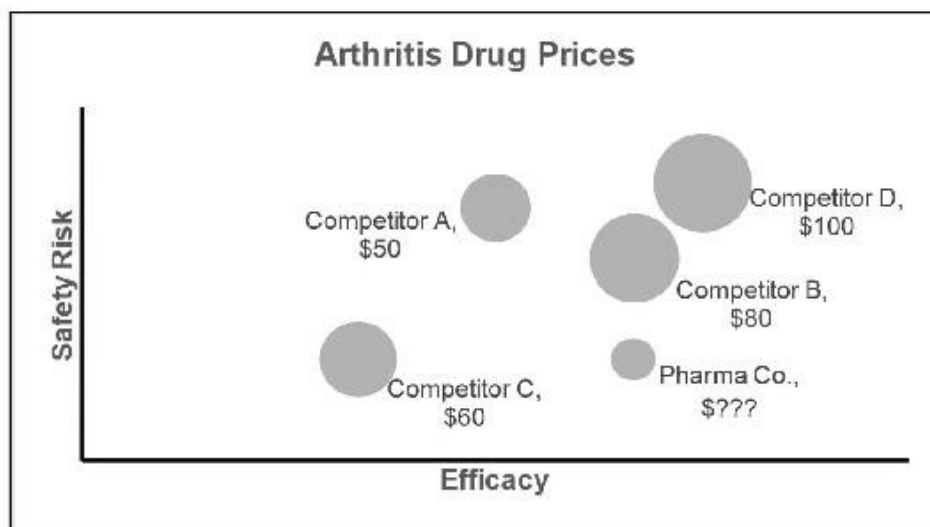
Sample Framework: One possible framework could look something like the following. The candidate does not need to have this exact framework, but should capture most of these points.

- Customer willingness to pay
 - How much is the customer willing to pay for this drug?
 - How much can the customer actually pay for the drug?
 - How does medical/drug insurance factor into how customers pay?
- Competitor pricing
 - Do competitors also offer a drug to treat Arthritis?
 - How effective/safe is their drug?
 - How much do competitors price their drug?
- Pharma Co.'s drug profitability
 - How much money has Pharma Co. invested in researching and developing the drug?
 - How much money does it cost to produce the drug?
 - In how much time is Pharma Co. looking to break even on the drug?
- Other pricing strategies
 - What other pricing strategies does Pharma Co. want to utilize?
 - Discounting for new customers
 - Bundling with other drugs
 - Subscription plan
 - How do these pricing strategies affect profit?

Question 1: In order to determine how to best price the drug, let's examine the competitors' drugs for arthritis. The prices of their drugs are shown below, and are plotted against efficacy and safety risk.

Efficacy is how effective the drug is at reducing symptoms of arthritis. High efficacy means the drug works well at reducing symptoms and providing relief, while low efficacy means the drug does not do much for the consumer.

Safety risk is how safe the drug is for the customer to take in terms of minimal side effects and health implications. Low safety risk means the drug has almost no side effects and does not damage the consumer's overall health. High safety risk means the drug has serious side effects and may pose a threat for the consumer's health.



(Sample answer is on the following page)

Answer to Question 1: The candidate should come to the conclusion that Pharma Co.'s drug should be **priced higher than \$80**. Depending on their reasoning, they could also say that the drug should be **priced higher than \$100**.

To estimate the price of Pharma Co.'s drug, we need to look at the competitor drugs' efficacy, safety, and relative price. Generally, drugs that have high efficacy and low safety risk will be the drugs that are priced the highest. Let's compare each of the competitors' drugs to Pharma Co.'s drug.

Compared to Competitor A's drug, Pharma Co.'s drug has both higher efficacy and lower safety risk. Therefore, Pharma Co. has a much better drug and it should be priced higher than Competitor A's drug that is priced at \$50.

Compared to Competitor B's drug, Pharma Co.'s drug has the same efficacy, but a lower safety risk. Therefore, Pharma Co. has the better drug and it should be priced higher than Competitor B's drug that is priced at \$80.

Compared to Competitor C's drug, Pharma Co.'s drug has the same safety risk, and a higher efficacy. Therefore, Pharma Co. has the better drug and it should be priced higher than Competitor C's drug that is priced at \$60.

Finally, compared to Competitor D's drug, Pharma Co.'s drug has a lower efficacy, but a lower safety risk. Therefore, it is hard to say whether the price of Pharma Co.'s drug should be higher or lower than \$100. It would depend on whether a customer would prefer having a higher efficacy drug if that meant taking on a higher safety risk.

We can look at the ratio of safety risk to efficacy. Ideally, we would want a low ratio, which implies low safety risk and high efficacy. Comparing Pharma. Co to Competitor D, Pharma Co. has a much lower ratio of safety risk to efficacy. Therefore, one could make the case that Pharma Co.'s drug is better, and should be priced higher than Competitor D's drug that is priced at \$100.

Question 2: Given the information about efficacy and safety risk in the previous question, how do you think Pharma Co. should market or brand their drug? What differentiates it from the four other drugs out there?

(Sample answer is on the following page)

Answer to Question 2: There are two possible answers to this question.

The candidate could say that Pharma Co.'s drug has the lowest safety risk in the market (tied with Competitor C). This could appeal to customers who are looking to avoid having serious side effects and health implications while relieving their arthritis symptoms.

The candidate could also say that Pharma Co.'s drug has the highest efficacy for the given amount of safety risk. In other words, Pharma Co.'s drug has the best "value" since it offers the lowest ratio of safety risk to efficacy. This could appeal to customers who are looking for the maximum amount of efficacy for the given amount of risk. This is analogous to the stock market, in which many investors want the highest returns for the given amount of risk.

Question 3: Next, let's look at what price Pharma Co. should price its drug at in order to break even from its investment within five years.

Pharma Co. has invested \$4B in this drug, and each drug costs pennies to make. We can consider the costs of drug production to be a negligible amount. We don't know the number of customers in the US market, so you will need to determine that through market sizing. Assume that Pharma Co. will have a 20% market share of the arthritis drug market once they launch their drug. Assume that someone with arthritis will take the drug twice a year.

(Sample answer is on the following page)

Answer to Question 3: An example of a market sizing approach is given below.

Structure for estimating the arthritis drug market size:

- Start with the US population
- Segment the US population by age
- Estimate what percentage of each age group has arthritis
- Estimate what percentage of people with arthritis will take a drug vs. choose not to

Let's assume that the US population is 320M people. Let's divide the US population into four different segments: (0-20), (20-40), (40-60), and (60-80). Each segment has 80M people.

For (0-20), let's assume 0% of the population has arthritis. You typically develop arthritis as you get older, and this age segment is far too young to have such a disease.

For (20-40), let's also assume that 0% of the population has arthritis for the same reason as before. This age segment is still too young to have a significant prevalence of arthritis.

For (40-60), let's assume 10% of people have arthritis. This is based on personal experiences of hearing of aunts, uncles, and grandparents that have arthritis. Therefore, there are 8M people with arthritis in this segment. ($10\% \times 80M$)

For (60-80), let's assume that 20% of people have arthritis. As people get older, we'd expect more people to have the disease. Therefore, there are 16M people with arthritis in this segment. ($20\% \times 80M$)

Adding up the different age segments, we get 24M people with arthritis. ($8M + 16M$)

Next, let's assume that 75% of these people will take a drug to

reduce the symptoms of arthritis. The other 25% will choose not to take a drug because of side effects or because they can tolerate their symptoms without any drug.

From this, we get 18M potential customers that take an arthritis drug.

Next, assuming we have a 20% market share, that brings the number of our own customers down to 3.6M.

Finally, we can set up a breakeven equation to estimate what the price of the drug should be to break even in 5 years.

The Breakeven Equation:

$$\text{Quantity} * (\text{Price} - \text{Variable Costs}) = \text{Fixed Costs}$$

We can calculate quantity first since we know the number of customers, how often they take the drug, and how long we have to break even

$$\text{Quantity} = 3.6\text{M customers} * 2 \text{ drugs a year} * 5 \text{ years}$$

$$\text{Quantity} = 36\text{M units of drug}$$

Variable Costs = \$0 (each drug costs pennies to produce, which is negligible)

$$\text{Fixed Costs} = \$4\text{B}$$

Plugging these values into the equation:

$$36\text{M} * \text{Price} = \$4\text{B}$$

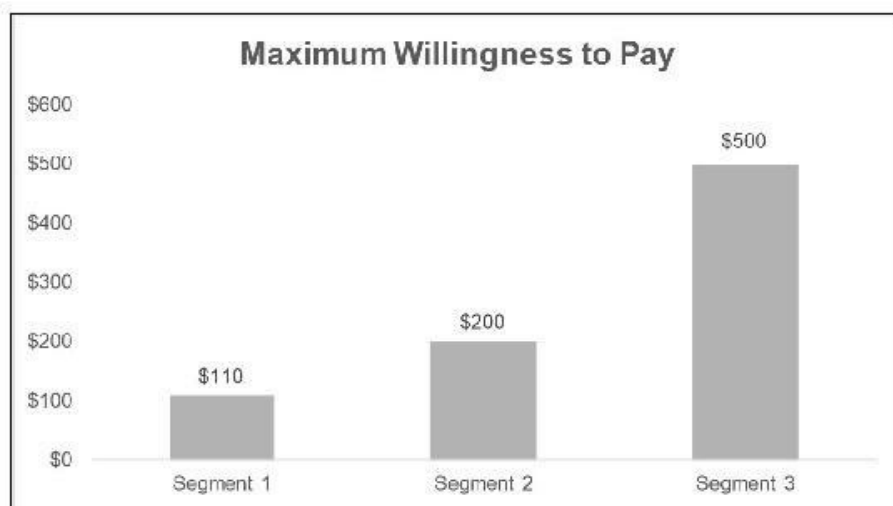
$$\text{Price} = \sim \$111$$

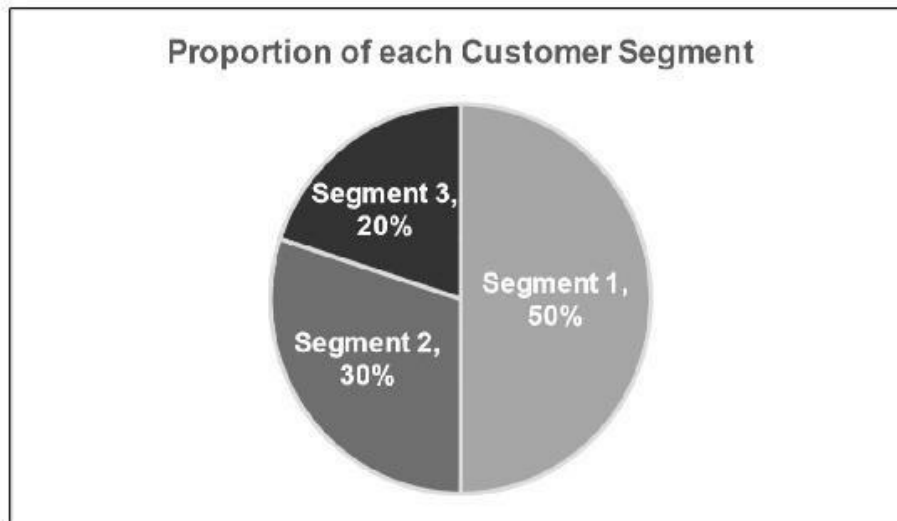
The drug needs to be **at least \$111** in price in order for Pharma Co. to break even within 5 years.

Question 4: We'll move onto examining different customer segments' willingness to pay. Let's say that there are three segments of customers, each with a specific maximum that they are willing to pay for the drug. For a given customer segment, if the price of the drug is set above their maximum willingness to pay, that customer segment will not purchase the drug at all. Let's assume that we can only set one price point for the drug, which is the price all customers see and pay. We cannot price the drug differently for different customer segments.

From the prior exercise, assume we have 3.6M customers and the breakeven price was ~\$110.

Given the information below, what price point should the drug be set at?





(Sample answer is on the following page)

Answer to Question 4: There are three different price points we can choose, \$110, \$200, or \$500. If we set a price point above \$500, no customers will buy the product. It would not make sense to price below \$110, since all customers are willing to pay at least \$110. Similarly, for prices between \$110-\$200, and \$200-\$500, it does not make sense to set a price in between those values since we can go up to the next highest maximum willingness to pay price point and get the same number of customers that will buy the drug.

If we set the price point at \$110, all customers will purchase the drug, giving us \$792M/year.

$(3.6\text{M customers} * 100\% \text{ customers} * 2 \text{ drugs a year} * 1 \text{ year} * \$110 = \$792\text{M/year})$

If we set the price point at \$200, customer segment 2 and customer segment 3 will purchase the drug, giving us \$720M/year.

$(3.6\text{M customers} * 50\% \text{ customers} * 2 \text{ drugs a year} * 1 \text{ year} * \$200 = \$720\text{M/year})$

If we set the price point at \$500, only customer segment 3 will purchase the drug, giving us \$720M/year.

$(3.6\text{M customers} * 20\% \text{ customers} * 2 \text{ drugs a year} * 1 \text{ year} * \$500 = \$720\text{M/year})$

Therefore, it makes sense to price the drug at **\$110** in order to get all customer segments to purchase the drug. This will create **\$792M/year** in revenue for Pharma Co.

Conclusion: Let's say that the CFO wants a quick answer to how much they should price their arthritis drug for. What would you say?

(Sample conclusion is on the following page)

Sample Conclusion: I recommend that we price our arthritis drug at \$110 for the following three reasons:

One, we did a breakeven analysis and determined that if we price the drug at \$110, we will be able to break even in roughly 5 years. This meets our company goal.

Two, examining the different customer segments and their respective willingness to pay, we determined that \$110 was the price point that would maximize revenue. If we price any higher, we lose customers, and revenues overall will decrease even though price has gone up.

Three, our drug price should be higher than that of our competitors because our drug has the highest efficacy for a given level of safety risk. The most expensive competitor drug is \$100, and we should be able to price higher than that.

For these three reasons, \$110 is the optimal price for the drug.

For next steps, I would like to look into two things. One, I'd like to look into ways to set a different price for different customer segments. This would allow us to further increase revenues. Two, I'd like to look into other pricing strategies such as discounting for new customers, bundling, or offering subscription pricing. These strategies may also further increase revenues.

Author Commentary: Especially for final-round interviews, expect to see various charts and figures with data. These can include: bar charts, bubble charts, line graphs, Venn diagrams, scatter plots, and flow charts. The interviewer will usually give you handouts with the charts and figures on them, but some interviewers are moving towards using interactive electronic tablets.

Make sure that you are familiar with all of the different ways that data can be presented and be able to interpret and analyze various charts and figures.

The “create your own bucket” was utilized for the last bucket in the framework. For final-round interviews, expect to be given more unusual business problems that require you to create one or two of your own buckets to address the case objectives.